Daylight Auroras

I HAVE frequently seen the appearances described by Mr. Winstanley in your issue of August 3, and I think I must have seen the one he mentions. I have on two occasions watched similar phenomena caused by the moon. These phenomena require the cloud or clouds, from which they are formed, to be of about the same azimuth as that of the sun (or moon), and vary with the form and motion of the cloud, being, I think, simply a deflection of the sun's rays from the more salient points of the cloud. The streamers I saw on June 27 (see NATURE of July 9) were of an entirely different nature, rising near the south horizon somewhat to the east of the meridian, and flashing towards the moon, which had recently passed the meridian, while the sun was near setting in the N.W.

I have had nearly thirty years' experience in observing, and have no doubt that what I described were true streamers of an aurora australis. JOHN LUCAS

Radcliffe Observatory, Oxford, Aug. 17

The Late Thunderstorm

THE thunderstorm which has just broken up the spell of hot weather for the past week presented some peculiar features as seen from this place. Commanding rather a wide horizon, I noticed about 8.30 last evening two distinct centres of disturbance, one S.W., the other N.E. It is impossible to estimate the distance by sound, as the thunder was inaudible. The electric spark, however, was visible enough, and I noticed that with one exception it went invariably from S. to W. in the one case, and from N. to E. in the other, and always horizontally from cloud to cloud. When I came out again at 10.15 I found the two centres had moved, so that one was slightly S. of E., and the other N. of W., but still directly opposite each other. It seems, too, that they had gone in the direction in which the electric spark had passed.

This seemed to me interesting, and I thought your readers might find it so too.

Upton-on-Severn, Aug. 14 W. M. ROBERTS

Sir William Thomson and the Origin of Life

I AM sure that Sir William Thomson will feel gratified rather than annoyed to be informed that he has been anticipated in his remarkable hypothesis regarding the origin of life on our globe.

In a very curious book called "A Visit to my Discontented Cousin," published some months ago, there is a portion of one chapter headed "The Aerolite." The "Discontented Cousin" having seen and heard a discussion on a meteoric stone, went home and "dreamt a dream," in which he saw the surface of the mass undergo various changes, and organic dots appear, one of which began to wriggle, rose to its microscopic legs, and confronted "the dreamer with a bold and self-confident mien."

This microscopic man, after having enjoyed "a glass of something stiff and a pipe," told the story of his own planet, beginning with the not very complimentary remark, "We know all about you, old boy, and the British Association; and we don't think much about you, either."

For the story itself I must refer to pp. 186-192 of the book.

Torquay, Aug. 8 G. E. D.

Meteorology at Natal

IN your issue of November 10 last I was glad to see that you were alive to even humble efforts to assist science in so distant a place as Natal by your remark on the new Meteorological Observatory for the Durban Station.

As it may be interesting also to know what has been done, I append a list of the instruments ordered by the Natal Government. They are to supplement a few already on board. Unfortunately for the furtherance of this object, the state of affairs at present will not admit of any large expenditure of public money in this direction, but I have been enabled to get the sum of 10*l.* in 1870 and 25*l.* in 1871 for the purchase of instruments. The Government, at the same time, pay the observer 12*l.* per annum for the trouble of registering the results regularly.

At present the military authorities have an observatory at Fort Napier, in Pietermaritzburg, at a height of 2,200 feet above and forty-five miles from the sea. A station on the coast was required to complete the observations, and the Government liberally came forward with the means. Hitherto a system of registration has been followed in which the instruments were suspended in wooden boxes against the sides of dwelling-houses. Though such a system, perhaps, is advisable as giving the temperature ordinarily felt by residents, it nevertheless is more or less uncertain for the purposes of comparison, from the fact of some of the dwellings being built of wood and others of stone, and again some roofed with slates and others with galvanised iron.

The present system is that pursued by the military authorities. The thermometers are placed under a Glaisher's stand in the open air. Whether the military authorities are right or wrong matters little so long as one universal system is pursued, so that exact comparison can be made between each station. The results will always be sent to the Meteorological Society of England, and published in the Colonial Blue Book for each year.

VINCENT ERSKINE

Pietermaritzburg, Natal, May 16

P.S.—I expect the Observatory to be in thoroughly good order from the 1st of January, 1872.

On the Colours of the Sea

THE following is submitted on the above subject, referred to in NATURE of July 13, as showing that the colour of the sea is not altogether dependent on the purity and depth of the water. At Zante, and southward as far as I have seen, it is of a deep blue at midday, but in the evening it is that described by Homer as "wine-like." I have observed this particularly when passing Navarino and Cape Mataplan. At night, looking down upon it from the steamer, it is quite black, lighted up, where the waves are broken, with white phosphorescent light.

I had once the gratification of seeing the whole of the solar spectrum spread out upon the sea, at Zante, on December 26, 1861. The weather was very unsettled at the time. During an interval, when the rain had ceased, a little before 10 A.M., the light of the sun descended from behind a cloud, and was reflected up to the height on which I was standing. Purple was the most remote colour; red the nearest; the space between was occupied by the other colours, of which green, yellow, and blue were the most marked. JOHN J. LAKE

Origin of Cyclones

IN NATURE of 23rd of June, 1871, there is an account of a paper, by Mr. Meldrum, on the origin of storms in the Bay of Bengal, showing reason to believe that the cyclones of the Bay of Bengal and the Southern Indian Ocean originate in the meeting of the trade-winds of the northern and southern hemispheres at some distance north or south of the equator. I do not know of any equally complete evidence on the subject for the cyclones of other parts of the world, but there is very strong reason for thinking that they always so originate. The line along which the two trade-winds meet each other approximately coincides with the equator: when it actually or nearly coincides with the equator, no cyclones are formed, because the rotation of a cyclone depends on that of the earth, and the earth at the equator has no rotation round an axis drawn vertical to the horizon. Over the greater part of the Pacific, cyclones do not appear to be formed: the reason of this probably is, that in consequence of the temperature of the sea changing but little with the seasons, the two trade-winds over the Pacific meet each other nearly on the equator all the year round; though I do not know how far this is confirmed by observations on the winds of that ocean. But we know that in the Indian Ocean the trade-winds cross the equator and are deflected into monsoons, so that in the summer of the northern hemisphere they meet to the north of the equator, and in the summer of the southern hemisphere they meet to the south. (This statement as to seasons will have to be qualified presently.)

We may consequently expect to find that the farther the sun is from the equator, the farther from the equator will be the meeting of the trade-winds, and consequently also the cyclones. This is the fact. In Dove's "Law of Storms," translated by Mr. Scott, at page 193, there is a chart of the tracks of the cyclones of the Chinese Sea, which shows that they occur in all months from June to November, and that the later in the season the nearer to the equator is usually their track. In the Chinese Sea, where they are called typhoons, they are most numerous in the summer months; in the Bay of Bengal they are most numerous after the equinoxes. This will appear

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quite intelligible if we regard the cyclone region of the Chinese Sea as an extension of that of the Bay of Bengal; it will then be seen that the cyclones follow the sun. This, however, must be understood with the qualification that they follow the sun at some distance; the number of cyclones in the Indian Ocean appears to reach its maximum a month or two after the equinoxes. This is for the same reason that the warmest period of the year is not at but after Midsummer.

The distribution of cyclones in the West Indian Seas is to be explained in the same way. The two trade-winds meet in the Atlantic a little to the north of the equator; for this reason cyclones are frequent in the West Indies but unknown over the South Atlantic, and they are most numerous at the end of summer.

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim

Saturn's Rings

AN absence in the country prevented my seeing Lieut. Davies's letter in time for an earlier reply. I will answer him on all points, and have done with him, for he employs unfair arguments to impeach me.

1. I defy him to point out the smallest word or slightest expression in my remarks on his work that justifies him in asserting "that I commenced my notice very much under the impression that Prof. Clerk Maxwell having investigated the stability of Saturn's rings, no one else is to venture into any discussion on their nature and origin." I never for a moment entertained, much less expressed, such a thought. I simply pointed out that Prof. Maxwell had shown rings of satellites to be the only ones which could exist, and I said merely that Lieut. Davies, "having espoused this theory, had sought an explanation" of it. Lieut. Davies's allusion to a *caveat* is therefore an empty flourish.

2. Lieut. Davies says I "assert" that he has not seen Prof. Maxwell's work. This is an unpardonable misstatement. I said he "appears not" to have seen the work; and I was driven to this assumption, since Lieut. Davies, while actually using Maxwell's labours, never mentions his name. Certainly he is at liberty to choose his own starting point: but he should credit the well and not the bucket (Mr. Proctor will pardon me) for his inspiring draught.

3. As to faith in figures. I take for granted that no rational man would publish numerical data unless he believed his figures really to mean what they stand for. Now, the rate of the solar motion is not known to within a thousand miles an hour, and the solar parallax is only certain to the first place of decimals. As Lieut. Davies prints the first of these data to a mile, and the second to four decimal places, he has clearly too great faith in figures. He may say that "other observers" (why observers?) do the same; that does not excuse him. Further, a different rate of solar motion must alter his spirals; if there were no motion he would have no spiral.

4. I know that "very clever men" have held the meteoric theory of the sun, but I also know that "very clever men" have held other theories. Lieut. Davies, in denying my assertion that he is "blindly enraptured" with the meteoric theory, actually supports me; for when he says that "none of the modern theories, 'cumbrous vagaries of the brain,' can compare with it," it is clear that he cannot see the fairness of any crow but his own, and this is blind infatuation.

5. Either we are not agreed upon the meaning of "cyclonic," or Lieut. Davies is sun-spot blind. I call such a spot as that reproduced on page 232 of Mr. Proctor's book "cyclonic," and I have seen many, both on the sun and in drawings, of this character. Lieut. Davies's range of observation must be limited if he has not seen some also. Mr. Carrington's work is quite beside the question; he did not delineate spots, he merely measured and counted them.

YOUR REVIEWER

Extinction of the Moa

THE very interesting article on the Moa in your issue of July 6th by Dr. Hector adds considerably to the facts already ascertained as to its existence along with man, and also as to the probability of its recent disappearance. Visiting in 1866 and 1867 many of the places mentioned by the Doctor in the Middle Island, I had opportunities of seeing portions of their remains in various conditions, either in caves, river sides, or in the open country where cultivation was going on, or on the sides of the hills in the interior, and certainly the impression produced was, that not perhaps more than fifty years had elapsed since some of the remains had formed part of living birds.

On the Kourow range of hills in the north of Otago, I saw Moa bones and those of a wild pig in close proximity; and, though certainly those of the former were more weathered, taking into consideration the greater density of the latter, it did appear as if there had not been a great many years between the deaths of each. I have also some bones in my possession, and there are others in the Geological Society's Museum in Edinburgh, found on the surface of the Carrick ranges, a place alluded to by Dr. Hector, the unexposed portions of which do not seem very aged. While agreeing with Dr. Hector that there is reason to believe that the last of the race have only of late disappeared, viewing the question from the point of an agriculturist, I differ somewhat as to the causes. He says that the facts he adduces "afford strong evidence that the bird has been exterminated by human agency, though the race was expiring from natural causes." It seems to me that in such a country as New Zealand their loss has arisen from natural causes, though the Aborigines may have assisted somewhat to diminish their number. Dr. Hector admits that there are still portions of Otago where the foot of man has scarcely trod, notwithstanding the search for gold, perhaps the most eager which can exist. The Moa had these districts to retire to. In the Middle Island very few Maories dwelt, and their numbers were kept down by the forays of the more warlike inhabitants of the North Island. The pigs, supplied to the natives by Captain Cook, have spread over the island and increased largely, and have only been prevented from still further increasing by the use of the musket and the occupation of the country by the settlers. While the Kiwi still maintains its place, it is hard to believe that man has exterminated the Moa. The natural causes, however, it seems to me, are quite sufficient. Dr. Hector speaks of large fires having spread over the centre of Otago. It would appear that the pine woods, which have covered so many of the hill sides of the interior, had reached a certain stage of decay, and, from the occurrence of droughts less severe than those of Australia, perhaps, fires lighted by the natives had spread to these woods, and though an undergrowth of fern and moss might retard the progress when once the pine timber, with its resinous qualities, thoroughly caught, there was little chance of it going out save from breaks caused by rivers or bare places. As these fires spread over the interior, destroying everything in the shape of bush or tree, the native grasses took their place, none of which seemed to me to afford fitting food for such a bird, and with these grasses a plant called by the native Tutu occupies much of the country. The leaves of this plant are, under certain conditions, destructive to live stock; while the berry which it produces may be eaten with impunity, provided the stone it contains be not swallowed; the settlers making a wholesome jelly of the pulp, and sometimes wine. Here, then, we have a vast portion of the country cleared of its food supplies, from the trees and shrubs which produced it being destroyed, and we have a poisonous plant abounding, which does not grow freely under wood. Dr. Hector speaks of counting thirty-seven skeleton heaps of Moas on the side of the Wakatipu Lake, and supposes that they had been driven there by fire. This may be so, but I have seen a great many similar heaps, in the centre of each of which two or three handfuls of quartz pebbles lay on the flat alluvial lands on the sides of streams and near the seashore, where beds of gravel then were, to which the birds could have retired, had they been pressed with fire, as no vegetation could have existed there. It therefore seems to me that the reason why so many skeletons are found on the surface near streams or water, arises from the fact that these creatures, pressed by hunger, partook of the Tutu berries, and that thirst, which so often accompanies poisoning, caused them to take to such places for drink. I have heard it stated that in periods of drought the Emus of Australia travel great distances for water. Though water is far more abundant in New Zealand, it is often only in the streams that it can be had.

JAMES MELVIN

NOTES

THE following is the programme of the subjects to be submitted for discussion at the International Congress of Anthropology and Archæology, to be held at Bologna from the 1st of October next:—The stone age in Italy; 2. The caverns of the shores of the Mediterranean, especially of Tuscany, compared with the caves of the south of France; 3. The lake habitations

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